

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.12. (Canceled)

13. (Currently Amended) A transmitting apparatus for 4-value FSK modulation for transmitting data using four symbol values, the transmitting apparatus comprising:

a dividing part supplied with original data arranged in order from one with highest importance, which comprises first data and second data after the first data and for dividing the first data into first bit data with a first number of bits and the second data into second bit data with a second number of bits larger than the first number of bits, the first data being protected and having a predetermined number of higher order bits, the second data not being protected into first bit data in a unit of one bit and the second data into second bit data in a unit of two bits;

a communication path quality decision part for deciding quality of an environment in a communication path;

a bit adding part for creating encoded data by adding redundant bit data or additional bit data, configured to add to each of the first bit data as a higher bit a redundant bit or an additional data bit associated with the original data to be transmitted, the redundant bit being predetermined so that the first bit data added with the redundant bit corresponds to any one of specific two symbol values, an interval between the specific two symbol values being largest of the four symbol values, to create encoded data in a unit of two bits, and to encode the second bit data in a unit of the divided two bits, wherein if it is decided by the communication path quality decision part that the quality of the communication environment is low, the redundant bit [data] is added to the first bit data to create the encoded data, while if it is decided that the

quality is high, the additional bit data associated with the original data to be transmitted is added to the first bit data to create the encoded data, and none of the redundant bit data and the additional bit data is added to the second bit data regardless whether the quality of the communication environment is low or high, to create the encoded data having the same number of bits as that of the encoded data created by adding either redundant bit data or additional bit data to the first data bit; and

a modulating part for performing modulation on the basis of the created encoded data to create and output a modulated signal.

14. (Canceled)

15. (Previously Presented) The transmitting apparatus according to claim 13, wherein the bit adding part operates to add the redundant bit data to each of the bits of the first bit data such that a gray code is produced.

16. (Currently Amended) The transmitting apparatus according to any one of claims 13 [to] or 15, the communication path quality decision part comprising a received signal strength indicator measuring part that measures a received signal strength indicator of a data transmission destination, wherein the bit adding part operates to acquire the received signal strength indicator from the received signal strength indicator measuring part and decide quality of an environment in the communication path on the basis of a level of the received signal strength indicator acquired.

17. (Currently Amended) The transmitting apparatus according to any one of claims 13 [to] or 15, wherein the bit adding part operates to acquire at least one piece of information among a received signal strength indicator measured by a data transmission destination, a vector error of a demodulated wave, and a bit error and

decide quality of an environment of the communication path on the basis of the information acquired.

18. (Canceled)

19. (Currently Amended) A receiving apparatus that receives a 4-value FSK modulated signal created by performing modulation on the basis of encoded data created in such a way that ~~in original data arranged in order from one with highest importance and comprising first data to be protected having a predetermined number of higher order bits and second data not to be protected after the first data, the first data is divided into first bit data with a first number of bits and the first bit data is added with redundant bit data or additional bit data associated with the original data to be transmitted is encoded to create encoded data, while the second data is divided into second bit data with a second number of bits larger than the first number of bits and the second bit data is added with none of the redundant bit data and the additional bit data to create encoded data, of supplying original data arranged in order from one with highest importance, which comprises first data and second data after the first data, the first data being protected and having a predetermined number of higher order bits, the second data not being protected, dividing the first data into first bit data in a unit of one bit and the second data into second bit data in a unit of two bits, adding to each of the first bit data as a higher bit a redundant bit or an additional data bit associated with the original data to be transmitted, the redundant bit being predetermined so that the first bit data added with the redundant bit corresponds to any one of specific two symbol values, an interval between the specific two symbol values being largest of the four symbol values, to create encoded data in a unit of two bits, and encoding the second bit data in a unit of the divided two bits, the receiving apparatus comprising:~~

a demodulating part for demodulating the received modulated signal;

a symbol deciding part for applying, at every Nyquist, symbol decision to the signal demodulated by the demodulating part;

a bit converting part for converting a symbol value obtained by applying the symbol decision by the symbol deciding part to a bit value having a predetermined number of bits; and

a frame recovering part for combining the bit data added to the first bit data from the bit value to form combined data, for deciding validity of the formed combined data based on whether a CRC error exists or not, and for recovering the combined data if it is decided to be valid, while deleting the combined data if it is decided to be invalid.

20. (Previously Presented) The receiving apparatus according to claim 19, wherein the frame recovering part operates to decide validity of the combined data formed by combining the added bit data in accordance with a cyclic redundancy check.

21. (Currently Amended) A method for transmitting data using four symbol values for 4-value FSK modulation, the method comprising the steps of:

receiving original data arranged in order from one with highest importance, which comprises first data and second data after the first data and dividing the first data into first bit data with a first number of bits and the second data into second bit data with a second number of bits larger than the first number of bits, the first data being protected and having a predetermined number of higher order bits, the second data not being protected and dividing the first data into first bit data in a unit of one bit and the second data into second bit data in a unit of two bits;

deciding quality of an environment in a communication path;

creating encoded data by adding redundant bit data or additional bit data, adding to each of the first bit data as a higher bit a redundant bit or an additional data bit associated with the original data to be transmitted, the redundant bit being predetermined so that the first bit data added with the redundant bit corresponds to any

one of specific two symbol values, an interval between the specific two symbol values being largest of the four symbol values, to create encoded data in a unit of two bits, and to encode the second bit data in a unit of the divided two bits, wherein if it is decided in the communication path quality deciding step that the quality of the communication environment is low, the redundant bit [data] is added to the first bit data to create the encoded data, while if it is decided that the quality is high, the additional bit data associated with the original data to be transmitted is added to the first bit data to create the encoded data, and none of the redundant bit data and the additional bit data is added to the second bit data regardless whether the quality of the communication environment is low or high, to create the encoded data having the same number of bits as that of the encoded data created by adding either redundant bit data or additional bit data to the first data bit; and

performing modulation on the basis of the created encoded data to create and output a modulated signal.

22. (Currently Amended) A data receiving method for receiving a 4-value FSK modulated signal created by performing modulation on the basis of encoded data created in such a way that ~~in original data arranged in order from one with highest importance and comprising first data to be protected having a predetermined number of higher-order bits and second data not to be protected after the first data, the first data is divided into first bit data with a first number of bits and the first bit data is added with redundant bit data or additional bit data associated with the original data to be transmitted is encoded to create encoded data, while the second data is divided into second bit data with a second number of bits larger than the first number of bits and the second bit data is added with none of the redundant bit data and the additional bit data to create encoded data, of supplying original data arranged in order from one with highest importance, which comprises first data and second data after the first data, the first data being protected and having a predetermined number of higher order bits, the~~

second data not being protected and dividing the first data into first bit data in a unit of one bit and the second data into second bit data in a unit of two bits and adding to each of the first bit data as a higher bit a redundant bit or an additional data bit associated with the original data to be transmitted, the redundant bit being predetermined so that the first bit data added with the redundant bit corresponds to any one of specific two symbol values, an interval between the specific two symbol values being largest of the four symbol values, to create encoded data in a unit of two bits, and encode the second bit data in a unit of the divided two bits, the receiving method comprising the steps of:

demodulating the received modulated signal;

applying, at every Nyquist, symbol decision to the signal demodulated in the demodulating step;

converting a symbol value obtained by applying the symbol decision in the symbol deciding step to a bit value having a predetermined number of bits; and

combining the bit data added to the first bit data from the bit value to form combined data, for deciding validity of the formed combined data based on whether a CRC error exists or not, and recovering the combined data if it is decided to be valid, while deleting the combined data if it is decided to be invalid.

23. (Currently Amended) A computer program of causing a computer to execute the processing steps of:

receiving original data arranged in order from one with highest importance, which comprises first data and second data after the first data and dividing the first data into first bit data with a first number of bits and the second data into second bit data with a second number of bits larger than the first number of bits, the first data being protected and having a predetermined number of higher order bits, the second data not being protected and dividing the first data into first bit data in a unit of one bit and the second data into second bit data in a unit of two bits;

deciding quality of an environment in a communication path;

creating encoded data by adding redundant bit data or additional bit data, adding to each of the first bit data as a higher bit a redundant bit or an additional data bit associated with the original data to be transmitted, the redundant bit being predetermined so that the first bit data added with the redundant bit corresponds to any one of specific two symbol values, an interval between the specific two symbol values being largest of the four symbol values, to create encoded data in a unit of two bits, and to encode the second bit data in a unit of the divided two bits, wherein if it is decided in the communication path quality deciding step that the quality of the communication environment is low, the redundant bit [data] is added to the first bit data ~~to create the encoded data~~, while if it is decided that the quality is high, the additional bit data associated with the original data to be transmitted is added to the first bit data to create the encoded data, and none of the redundant bit data and the additional bit data is added to the second bit data regardless whether the quality of the communication environment is low or high, to create the encoded data having the same number of bits as that of the encoded data created by adding either redundant bit data or additional bit data to the first data bit; and

performing modulation on the basis of the created encoded data to create and output a modulated signal.

24. (Currently Amended) A computer program for causing a computer to execute a method for receiving a 4-value FSK modulated signal created by performing modulation on the basis of encoded data created in such a way that ~~in original data arranged in order from one with highest importance and comprising first data to be protected having a predetermined number of higher order bits and second data not to be protected after the first data, the first data is divided into first bit data with a first number of bits and the first bit data is added with redundant bit data or additional bit data associated with the original data to be transmitted is encoded to create encoded data, while the second data is divided into second bit data with a second number of bits~~

larger than the first number of bits and the second bit data is added with none of the redundant bit data and the additional bit data to create encoded data, of supplying original data arranged in order from one with highest importance, which comprises first data and second data after the first data, the first data being protected and having a predetermined number of higher order bits, the second data not being protected, dividing the first data into first bit data in a unit of one bit and the second data into second bit data in a unit of two bits and adding to each of the first bit data as a higher bit a redundant bit or an additional data bit associated with the original data to be transmitted, the redundant bit being predetermined so that the first bit data added with the redundant bit corresponds to any one of specific two symbol values, an interval between the specific two symbol values being largest of the four symbol values, to create encoded data in a unit of two bits, and encode the second bit data in a unit of the divided two bits, the receiving method comprising the steps of:

demodulating the received modulated signal;

applying, at every Nyquist, symbol decision to the signal demodulated in the demodulating step;

converting a symbol value obtained by applying the symbol decision in the symbol deciding step to a bit value having a predetermined number of bits; and

combining the bit data added to the first bit data from the bit value to form combined data, for deciding validity of the formed combined data based on whether a CRC error exists or not, and recovering the combined data if it is decided to be valid, while deleting the combined data if it is decided to be invalid.